PATENT

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In re Application of Bailey et al.

Application Serial No. 10/820,972

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Art Unit 1793

Examiner Shuangyi Abu Ali

Confirmation No. 9539

STARCH BINDER COMPOSITIONS, METHODS OF MAKING THE SAME AND PRODUCTS FORMED THEREFROM

Docket No. 030621/MIL.0005.US00

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APPEAL BRIEF

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Archer-Daniels-Midland Company, owner of the entire right, title, and interest in the above-referenced patent application (the "Subject Application"), submits this appeal brief in accordance with the provisions of 37 C.F.R. § 41.37 in response to (i) the Final Office Action mailed on January 21, 2009, (ii) the Notice of Appeal filed on April 21, 2009, and (iii) the Advisory Action mailed on May 19, 2009. The Commissioner is hereby authorized to charge PTO Deposit Account No. 11-1110 for any fees necessary for consideration of this brief and appeal.

I. REAL PARTY IN INTEREST

The real party in interest is Archer-Daniels-Midland Company, by reason of assignment of the Subject Application and the invention from the inventors, recorded at Reel 015202, Frame 0294.

II. RELATED APPEALS AND INTERFERENCES

An Amendment was filed on April 21, 2009 within the three-month shortened statutory period for reply to the Final Office Action mailed on January 21, 2009. The Amendment presented the rejected claims in better form for consideration on appeal pursuant to 37 C.F.R. § 1.116(b)(3).

A Notice of Appeal and a Pre-Appeal Brief Request for Review were also filed in the Subject Application on April 21, 2009. The Pre-Appeal Brief Conference resulted in a Notice of Panel Decision from Pre-Appeal Brief Review mailed April 27, 2009 in which the Conference Panel upheld the rejections in the January 21, 2009 Final Office Action. The Conference Panel passed the appeal proceeding to the Board of Patent Appeals and Interferences (the "Board") for full consideration.

Appellant is not aware of any other appeals or any interferences that may be related to, may directly affect or be directly affected by, or have a bearing on the decision of the Board in the present appeal.

III. STATUS OF CLAIMS

A. Claim Status

Claims 1-35 and 46-50 are pending in the Subject Application. Claims 36-45 were previously canceled without prejudice or disclaimer in an Amendment filed on September 4, 2007. Claims 8, 9, 16, 17, 24, 25, 34, and 35 are currently withdrawn from consideration. Claims 1-7, 10-15, 18-23, 26-33, and 46-50 were under examination on the merits and form the basis of this Appeal. Claims 1, 10, 18, 26, and 50 are independent claims.

B. Rejoinder

Claims 8, 9, 16, 17, 24, 25, 34, and 35 were previously withdrawn from consideration in response to a Restriction Requirement mailed on February 7, 2007. Claims 8, 9, 16, 17, 24, 25, 34, and 35 each depend from and incorporate the features of one of independent claims 1, 10, 18, and 26. Accordingly, Appellant respectfully requests rejoinder of claims 8, 9, 16, 17, 24, 25, 34, and 35 pursuant to MPEP § 821.04 in the event that claims 1, 10, 18, and 26 are held allowable.

C. Procedural Posture

In the Final Office Action mailed on January 21, 2009 (the "Final Office Action"), pending claims 1-7, 10-15, 18-23, 26-33, and 46-50 were rejected by the Examiner under 35 U.S.C. § 103(a) as allegedly having been obvious over United States Patent No. 5,766,366 to Ferguson et al. ("Ferguson") in view of United States Patent No. 4,407,955 to Muller et al. ("Muller"). In the Final Office Action, the Examiner maintained the § 103(a) rejection as generally set forth in the previous non-final Office Action mailed on July 16, 2008 (the "non-final Office Action") despite Appellant's remarks filed on November 13, 2008 in response to the non-final Office Action, which clearly pointed out the distinctions between the pending claims and the cited art and the deficiencies of the Examiner's alleged *prima facie* case.

In response to the Final Office Action, Appellant filed an after-final Amendment pursuant to 37 C.F.R. § 1.116(b)(3) on April 21, 2009 presenting the rejected claims in better form for consideration on appeal. On April 21, 2009, Appellant also filed a Notice of Appeal and a Pre-Appeal Brief Request for Review. The Conference Panel issued a Notice of Panel Decision from Pre-Appeal Brief Review on April 27, 2009 indicating that the Subject Application remains under appeal because issues remain for consideration by the Board.

Subsequently, in an Advisory Action mailed on May 19, 2009 ("Advisory Action"), the Examiner indicated that the after-final Amendment filed on April 21, 2009 failed to place the Subject Application in condition for allowance, but that the claim amendments presenting the rejected claims in better form for consideration on appeal were entered.

Accordingly, claims 1-7, 10-15, 18-23, 26-33, and 46-50 stand rejected and are the subject of the present appeal. The text of claims 1-7, 10-15, 18-23, 26-33, and 46-50 is set forth in the Claims Appendix beginning at page 28 of this Appeal Brief. The text of withdrawn claims 8, 9, 16, 17, 24, 25, 34, and 35 is also presented in the Claims Appendix because Appellant requests rejoinder of these claims.

IV. STATUS OF AMENDMENTS

In the Advisory Action, the Examiner indicated that the after-final Amendment filed on April 21, 2009 was entered for purposes of appeal. Accordingly, all amendments have been entered and the current text of the pending claims is presented in the Claims Appendix.

V. SUMMARY OF CLAIMED SUBJECT MATTER

All references herein to the specification of the Subject Application refer to the paragraph numbers of the specification as originally filed, not as published. The claims under consideration in the present appeal include five (5) independent claims, claims 1, 10, 18, 26, and 50.

Gypsum board, otherwise known as drywall or wallboard, is a building material commonly used to construct walls in commercial and residential buildings. Gypsum board generally comprises a core material sandwiched between two backing sheets. The backing sheets are typically paperboard or other cellulose-based sheet material. The core material is commonly a plaster comprising a calcined semi-hydrated calcium sulfate (*e.g.*, $CaSO_4 \cdot \frac{1}{2}H_2O$), a reinforcing agent (*e.g.*, cellulose or fiberglass), a surfactant agent (*e.g.*, a wax emulsion), and a binder material.

Acid-modified industrial grain sorghum is a thin boiling starch composition that is often added to the plaster slurry as a core binder material in the manufacture of gypsum board. To form gypsum board, the slurry is deposited, leveled, and compressed between the two backing sheets, allowed to set, and then dried in a kiln to remove excess moisture. The soluble sugars of the sorghum binder are believed to migrate toward the core-backing interface and partially enter into the backing sheets during the setting and drying processes, thereby promoting a chemical bond between the backing and core at the interface.

A number of attempts have been made to improve the properties of gypsum board, for example, by modifying the components, chemistries, and/or processing conditions employed to manufacture wallboard. In many instances, efforts to improve the properties of gypsum board significantly increase the manufacturing cost of the finished wallboard. However, the present inventors developed a novel acid-modified dry-milled flour composition that finds utility as a binder for gypsum board core and that significantly improves the properties of finished wallboard.

Independent claim 1 recites an acid-modified dry-milled flour composition. The composition comprises a viscosity profile characterized in that at (i) a 14.5% solid concentration, (ii) a starting temperature of 30°C, and (iii) a heating rate increase of 7.5°C/minute, the composition at a time zero through gelatinization undergoes a viscosity increase to a maximum value in the range of between 600 and 1600 BU torque at a time in the range of between 6.5 to 7.2 minutes, followed by a decrease in viscosity to a value in the range of 240 to 640 BU torque at a time of 8.4 minutes. The viscosity measurements are based on a Brabender micro visco amylograph.

As used in the Subject Application, including the claims, a "dry-milled flour composition" is a flour product of a processed raw grain. Specification, para. [0021]. A dry-milled flour composition includes whole grains, whole grain components, and/or disassociated grain tissues, which are present in various particle sizes depending upon the types of milling processes (*e.g.*, crushing, grinding, commutating, etc.), and the types of separations performed during or after the milling processes. Id. A dry-milled flour composition is compositionally and chemically different and distinct as compared to the pure starch product of a wet-milled grain. Id.

The term "acid-modified" in the claims refers to contacting a dry-milled flour composition with an acid to chemically and/or physically alter the composition, particularly the starch portion of the composition, through degradative mechanisms that modify the viscosity of the composition. Specification, para. [0023].

The term "gelatinization" in the claims refers to the physico-chemical change of the starch portion of a flour composition characterized by a swelling of starch granules with a solvent (typically water) upon the addition of heat. Specification, para. [0022]. Gelatinization breaks down the intermolecular hydrogen bonds between starch molecules in the presence of the solvent and heat, thereby allowing the hydrogen bonding sites (*e.g.*, hydroxyl groups and heteroatomic oxygen) to engage more water and/or other polar solvent. Penetration of the solvent into the starch granules increases randomness in the intermolecular structure and decreases the number and size of

crystalline regions, which tend to resist penetration by solvent. Heat causes such regions to be diffused so that the chains begin to separate into an amorphous form. Gelatinization results in an increase in viscosity. Id.

The term "Brabender micro visco amylograph" in the claims refers to a measuring apparatus commercially available from C.W. Brabender, South Hackensack, NJ. Specification, para. [0024]. The device is known in the art as a standard instrument for measuring the gelatinization properties and characteristics of starch and flour compositions. The device measures a viscosity profile of a flour-water or starch-water suspension or slurry at a predetermined percent solids concentration by measuring the viscosity over a predetermined temperature-time profile (*i.e.*, a "measurement cycle" or "evaluation pattern"). Specification, para. [0024], [0051]-[0052], and [0058].

The viscosity is measured over time beginning at a predetermined start temperature and proceeding at a predetermined temperature increase rate for either a predetermined time interval or until a predetermined maximum temperature is reached (*i.e.*, a "heating period"). The maximum temperature is held for a predetermined period of time (*i.e.*, an "initial holding period"). The temperature is then decreased at a predetermined rate for either a predetermined time interval or until a predetermined finish temperature is reached (*i.e.*, a "cooling period"). Finally, the finish temperature is held for another predetermined period of time (*i.e.*, a "final holding period"). The viscosity is measured over all four periods.

Examples of temperature-time profiles and resulting viscosity profiles are presented in Figures 3-6 of the Subject Application. In Figures 3-6, the heating period begins a time zero and runs to point C, the initial holding period runs from point C to point D, the cooling period runs from point D to point E, and the final holding period runs from point E to point F. Point A corresponds to the onset of gelatinization, and point B corresponds to maximum viscosity achieved during gelatinization.

In a Brabender micro visco amylograph apparatus, a flour-water suspension or slurry is placed in a bowl rotating at a constant predetermined angular velocity (RPM)

and subjected to a measurement cycle or evaluation pattern comprising a heating period, an initial holding period, a cooling period, and a final holding period according to a predetermined temperature-time profile. During the measurement cycle a stirrer is completely immerged into the suspension or slurry. The stirrer is connected to a high-resolution torque measuring sensor, which measures the torque exerted by the suspension or slurry on the stirrer as the suspension or slurry rotates in the bowl. The torque (measured in Brabender Unit (BU) torque) is a relative measure of the viscosity of the suspension or slurry. Additional information regarding the Brabender micro visco amylograph may be found, for example, at http://www.cwbrabender.com/MicroVisco AmyloGraph.html.

The novel acid-modified dry-milled flour composition developed by the present inventors, and as recited in claim 1, comprises the dry-milled and acid-modified flour product of a processed raw grain. Therefore, the composition may comprise, *inter alia*, starch, oils/fats, proteins, and insoluble fibers. The flour composition recited in claim 1 is characterized by specific material properties. In particular, the claimed flour composition must exhibit a viscosity increase from a starting viscosity to a maximum viscosity value in the range of 600-1600 BU torque when comprising a slurry or suspension having a 14.5% solids concentration, and heated from 30°C at a rate of 7.5°C/minute.

The rapid viscosity increase must occur during the heating period in a Brabender micro visco amylograph apparatus, and must occur up through gelatinization, which may be determined by an initial local maximum in viscosity achieved during the heating period in the Brabender micro visco amylograph apparatus. After achieving the local viscosity maximum corresponding to gelatinization, the composition must exhibit a viscosity decrease from the 600-1600 BU torque maximum to a value in the range of 240-640 BU torque within 8.4 minutes from time zero, which corresponds to the end of the heating period and the start of the initial holding period. These viscosity properties must be achieved using a 7.5°C/minute temperature increase rate to heat the composition up to a predetermined 93°C maximum temperature. By way of non-limiting

examples, compositions exhibiting these properties are described in the specification in paragraphs [0048], [0052]-[0053], and [0056]-[0062], in conjunction with the table on the top of page 21, and in conjunction with Figures 5 and 6.

Independent claim 10 also recites an acid-modified dry-milled flour composition. Claim 10 is similar to claim 1. However, the composition recited in claim 10 is characterized by an at least a 40 percent decrease in viscosity from the 600-1600 BU torque maximum at gelatinization within 8.4 minutes from time zero. The composition recited in claim 10 also comprises a protein content of a cereal flour. These features are described in the specification in paragraphs [0053] and [0039], respectively.

Independent claim 18 also recites an acid-modified dry-milled flour composition. Claim 18 is also similar to claim 1. However, the composition recited in claim 18 is characterized by a decrease in viscosity from the 600-1600 BU torque maximum at gelatinization and a subsequent increase in viscosity to a value that is substantially the same as the maximum value achieved at gelatinization by the end of a constant temperature holding period. This feature is described in the specification in paragraphs [0049] and [0053], in Table 1 on page 17, and illustrated in Figures 5 and 6.

Independent claim 26 is a product-by-process claim reciting an acid-modified dry-milled flour composition produced by a particular process. The process comprises dry-milling a grain, thus forming a flour. The flour is combined with an acid to form a mixture. The mixture is heated to a temperature of 85°C or less for a sufficient time effective to obtain the acid modified dry-milled flour composition. Various embodiments of this process are described in the specification in paragraphs [0026]-[0045] and illustrated in Figure 1.

Independent claim 50 recites an acid-modified dry-milled flour composition. Claim 50 is similar to claim 1. However, the particular composition recited in claim 50 is formed from a flour selected from the group consisting of dry-milled milo flour, dry-milled corn flour, and combinations thereof. This feature is described in the specification in paragraph [0027].

An acid-modified dry-milled flour composition having the material properties recited in the claims of the Subject Application may find utility as a binder composition in the manufacture of gypsum board. The present inventors determined that a composition according to the invention recited in the claims of the Subject Application, when incorporated into a plaster slurry used to form a gypsum board, provides advantages over conventional wallboards that do not employ a composition as recited in the claims. In particular, it has been determined that certain compositions according to the present claims, when incorporated in a wallboard product, may provide significant industry performance enhancements that may include one or more improved properties. These properties may include: (i) reduced binder usage of 23 percent or more in the plaster slurry that forms the core material; (ii) reduced kiln temperatures of 30°F or more, due, in part, to the rapid hot paste viscosity breakdown that allows water in the gypsum slurry to be released easier; (iii) improved humidified bonds between plaster core and paper backing, with up to 85 percent reduction in bond failures; (iii) greater nail pull resistance; (iv) a lighter density wallboard due to greater air entrapment and faster set time; (v) greater flexural strength; and (vi) reduced end burn. Specification, para. [0047], [0051], [0061]-[0063].

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether the Examiner has established a *prima facie* case that claims 1-7, 10-15, 18-23, 26-33, and 46-50 are unpatentable under 35 U.S.C. § 103(a) as having been obvious over Ferguson in view of Muller.

2. If claims 1-7, 10-15, 18-23, 26-33, and 46-50 are allowable, whether claims 8, 9, 16, 17, 24, 25, 34, and 35 should be rejoined under MPEP § 821.04.

VII. ARGUMENT

(A) THE EXAMINER HAS NOT ESTABLISHED A *PRIMA FACIE* CASE THAT CLAIMS 1-7, 10-15, 18-23, 26-33, and 46-50 ARE UNPATENTABLE UNDER 35 U.S.C. § 103(a).

Obviousness under 35 U.S.C. § 103(a) is a question of law based on at least three underlying findings of fact:

(1) The scope and content of the prior art;

(2) The differences between the claimed invention and the prior art; and

(3) The level of ordinary skill in the pertinent art.

Based on these facts, the legal conclusion of whether a claim, as a whole, is obvious or non-obvious is made based on a preponderance of the evidence standard. See Graham v. John Deere Co., 383 U.S. 1, 17-18 [148 USPQ 459] (1966); KSR International Co. v. Teleflex Inc., 550 U.S. 398 [82 USPQ2d 1385] (2007); In re Oetiker, 977 F.2d 1443 [24 USPQ2d 1443] (Fed. Cir. 1992).

To this end, the MPEP provides that the contents of a § 103(a) rejection set forth in an Office Action should include:

(1) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate;

(2) the difference or differences in the claim over the applied reference(s);

(3) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter; and

(4) an explanation as to why the claimed invention would have been obvious to one of ordinary skill in the art at the time the claimed invention was made.

MPEP § 706.02(j).

As part of the determination of the scope and content of the prior art, prior art references must be considered in their entirety, *i.e.*, as a whole, including portions that

would lead away from the claimed invention. MPEP § 2141.02(VI). As part of the determination of the differences between the claims and the prior art, all of the words and features recited in the claims must be considered in judging the patentability of the claim against the prior art. MPEP § 2143.03. Indeed, in determining the differences between the prior art and the claims, the question under § 103(a) is whether the claimed invention as a whole would have been obvious. MPEP § 2141.02.I. It is the invention as a whole, and not some part of it, which is evaluated for obviousness under § 103. MPEP § 2141.02.V.

Accordingly, a determination regarding the obviousness or non-obviousness of the claims in a patent application involves a direct comparison of the subject matter of the claims, as a whole, to the teachings of the cited references, as a whole. A *prima facie* case of obviousness requires that the claims would have been obvious to a person skilled in the art at the time of the invention despite the differences between the claims and the teachings of the cited references. Thus, rejections on obviousness grounds cannot be sustained with mere conclusory statements or unsupported assertions. The Examiner must clearly communicate logical reasoning with rational underpinnings based on a preponderance of factual evidence to support the legal conclusion of obviousness. See MPEP § 2141.

Appellant respectfully submits that the Examiner has failed to properly establish a prima facie case under § 103(a). In the present matter, there are very significant differences and substantial distinctions between the compositions and methods recited in the present claims and the compositions and methods disclosed in Ferguson and Muller. These differences and distinctions create a very large gap between the prior art and the claimed invention that is "so great as to render the [present claims] nonobvious to one reasonably skilled in the art." MPEP 2141.III (quoting Dann v. Johnston, 425 U.S. 219, 230 [189 USPQ 257, 261] (1976)).

The primary reference relied upon by the Examiner in rejecting the present claims is Ferguson. Ferguson discloses a process for producing a dry thinned starch.

Starch is a polysaccharide carbohydrate material having multiple glucose monosaccharide units covalently linked together by glycosidic bonds. See, e.g., "Starch" in The Condensed Chemical Dictionary, 10th ed., G. G. Hawley, Litton Educational Publishing, Inc., 1981. Chemically, starch is a relatively pure material consisting essentially of polysaccharide molecules. Id. Thinned starches exhibit lower viscosities compared to natural starches and are prepared by reducing the molecular weight of the starch polymers. Ferguson, c.1, ll. 51-52. Thinned starches find utility in paper coating formulations. Ferguson, c.1, ll. 33-35.

The essential characteristics of the Ferguson process for producing thinned starches include the injection of a glycosidic hydrolyzing chemical, such as an acid, into starch that is in a non-slurry state (*i.e.*, not in contact with water and therefore "dry"). Ferguson, c.2, ll.1-11. The dry starch/acid combination is heated at a temperature and for a time necessary to produce a dry thinned starch that allows for higher solids concentration compositions that exhibit the same viscosities as lower concentration starch compositions. Id. Ferguson discloses a number of starches that can be thinned by the disclosed dry thinning process (see c.2, ll.25-27), but the reference fails to disclose the processing source of the starches.

Muller is relied on by the Examiner as a secondary reference, which the Examiner uses to modify the teachings disclosed in Ferguson. Muller discloses a process for converting the starch fraction derived from a dry-milled cereal grain into a sterile aqueous solution of fermentable sugar (*i.e.*, primarily glucose monosaccharide). Muller, c.4, ll.4-64. The process disclosed in Muller comprises the steps of hydrolyzing an aqueous slurry of the starch fraction derived from dry-milled cereal grain, separating any protein and oil from the starch hydrolysate, and further hydrolyzing the resulting purified starch to provide an aqueous solution of fermentable glucose. Id. In the background section of the patent, the Muller reference seemingly suggests that wet milling processes are more energy and capital intensive, and therefore more expensive, than dry milling processes. Muller, c.2, ll.31-41.

In rejecting the present claims in view of Ferguson and Muller, the Examiner asserts that it would have been obvious to a person skilled in the art to use dry-milled starch in the process described in Ferguson motivated by the fact that Muller allegedly suggests that dry milling processes are relatively cheap and economical. Non-final Office Action, page 4, first paragraph. The Examiner also asserts that an acid modified starch composition resulting from a combination of Ferguson and Muller would be made by a process substantially identical to the process in the instant claims, and therefore, the Examiner contends that the compositions would be expected to have similar properties. Id. at second paragraph. Appellant respectfully disagrees with the Examiner's position. Appellant submits that Ferguson and Muller, alone or in combination, would not have suggested an acid modified dry-milled flour composition comprising the properties recited in the present claims, and therefore, the present claims would not have been obvious in view of the references cited by the Examiner.

(1) Claims 1, 5, 47, and 48 would not have been obvious in view of Ferguson and Muller.

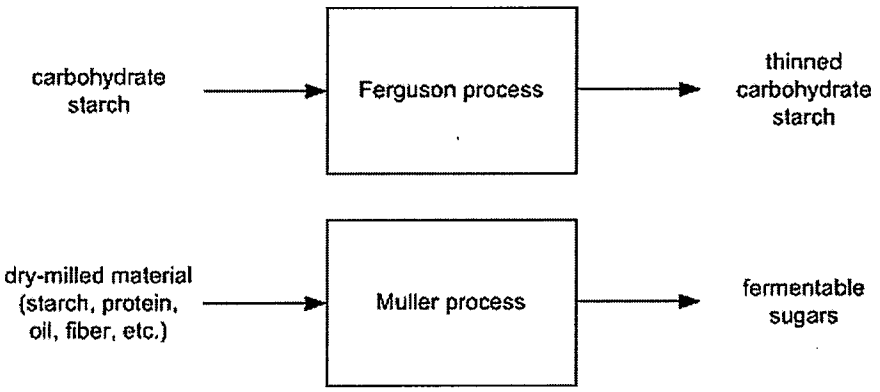
Claim 1 recites an acid modified dry-milled flour composition. As described in the Subject Application, a dry-milled flour refers to the flour product of a processed raw grain in the substantial absence of liquid, as compared to the pure starch of a wet-milled cereal grain. Specification, para. [0021]. A dry-milled flour composition as used in the Subject Application, including the claims, is understood to include the whole cereal grains themselves, grains with at least a portion of the seedcoats removed, and/or individual grain tissues. Id. These materials may include grain, grit, meal, flakes, or flour. Id. Moreover, as used in the Subject Application, dry-milled flour compositions may comprise ash, proteins, fats, and insoluble fibers. Id. at para. [0039]. These portions of the specification clearly teach the significant differences between starch compositions (as disclosed in Ferguson) and flour compositions (as recited in the present claims including claim 1).

It is clearly evident that Ferguson is directed to processes involving purified starch materials derived from wet-milled grains – i.e., dry thinned starch polysaccharides. See Ferguson, c.2, ll.16-60 (describing various base starches in terms of specific molecular structure, *i.e.*, amylopectin, amylose, and chemically derivatized versions thereof). A person skilled in the art would have known that wet-milling processes are generally designed to isolate pure starch from the other components of whole-grain materials. See, e.g., Muller, c.2, ll.18-21 (stating that "Wet milling processes typically remove **all** but an insignificant amount of non-starch materials, i.e., protein, cellulosic fiber and oil, from the starch component of the grain..." (emphasis added)). Indeed, Ferguson provides no mention whatsoever of the non-starch (*i.e.*, the non-carbohydrate) components of processed raw grains such as fats and proteins. Rather, Ferguson focuses exclusively on starch carbohydrate materials. The starch carbohydrate materials involved in the Ferguson process are therefore compositionally and chemically different and distinct from the flour composition recited in claim 1.

Muller does not remedy the clear deficiencies of Ferguson. Muller recognizes that the material resulting from a dry-milled grain may include proteins and oils in addition to carbohydrate starches. Muller, c.4, ll.17-18. However, as discussed above, Muller focuses on taking dry-milled materials and processing the materials to produce an aqueous composition comprising "fermentable sugars, primarily glucose." Muller, c.4, ll.58-64. Thus, during the process disclosed in Muller, the carbohydrate starch fraction of the dry-milled materials are hydrolyzed to fermentable monosaccharides. Id. As stated in Muller, after final hydrolysis the "hydrolysate slurry is then separated into an aqueous portion containing fermentable sugars, primarily glucose, and a part of the water soluble components and a water insoluble protein and oil (and fiber, if originally present) portion containing the remaining part of the water soluble components." Id. Here, Muller clearly teaches separating protein and oil from carbohydrate (glucose derived from starch).

Moreover, Muller also states that "[i]t is also within the scope of this invention to remove the protein, oil and/or fiber from the partial hydrolysate prior to subjecting the latter to final hydrolysis." Hence, Muller expressly teaches separating any proteins, oils, and fibers from the carbohydrates present in dry-milled materials using the invention described in the reference. Therefore, like Ferguson, Muller emphasizes purified carbohydrate materials having all non-carbohydrate components purposefully removed.

The Examiner asserts that "it would have been obvious to one of ordinary skill in the art at the time of the invention by applicant to use a dry mill [*sic*] starch in the Ferguson et al. process, motivated by the fact that Muller et al., also drawn to starch treatment, disclose [*sic*] that starch made from dry mill process [*sic*] is cheap and economic." Office Action, page 3, first full paragraph. The Examiner goes on to assert that "[e]conomics alone is a basis for clear motivation." Id. However, these assertions ignore the express technical disclosure in both Ferguson and Muller. Ferguson discloses a process that produces thinned pure starches from a pure starch feed. Muller discloses a process that produces isolated and purified fermentable sugar from the starch fraction of dry-milled cereal grain. In illustrative form:



Both references are directed to producing isolated and purified carbohydrate compositions as the end products of the respective processes. The references, alone or in combination, do not teach or suggest an acid-modified dry-milled **flour** composition.

Throughout the prosecution of the Subject Application, the Examiner has failed to explain why a person skilled in the art viewing Ferguson would find it obvious to modify the reference teachings so that the feed to the Ferguson process is a dry-milled material containing protein, oil, and fiber components rather than the pure carbohydrate starch taught in Ferguson. Appellant does not dispute that when compared in isolation, dry-milling processes may be less expensive than wet-milling processes. Nevertheless, the products of these two milling processes are compositionally and chemically different and distinct, and a person skilled in the art would not have found it obvious to substitute a dry-milled cereal grain for a wet-milled carbohydrate starch in the Ferguson process regardless of whether it would be cheaper. Dry-milled grain materials, which include fat, protein, and fiber components, are simply incompatible with the purposes and technical disclosure described in Ferguson. This would have been readily apparent to a person skilled in the art.

In essence, in order to arrive at the compositions recited in the present claims, including claim 1, the Examiner asserts that it would have been obvious to a person skilled in the art to substitute raw dry-milled flour for the purified starch material utilized as the feed to the Ferguson process. However, the Office has failed to provide any reason, other than an alleged economic benefit, why a person skilled in the art would make the asserted modification. In this case, the fact that dry milling may be cheaper than wet milling is a clearly insufficient rationale for modifying the reference teachings, especially because the modification would radically change the processes and compositions disclosed in the primary reference.

In the present matter, the fact that dry milling may be cheaper than wet milling is irrelevant because Ferguson is entirely directed to starch and starch processing. The feed to and product from the Ferguson process is a starch. The non-carbohydrate flour components of a flour composition (*e.g.*, fat and protein) would have no purpose whatsoever in the Ferguson process. Thus, there is no reason to use flour in the Ferguson process. Given the nature of the teachings in Ferguson, Appellant submits that any purported reason to use flour in the Ferguson process would be based on an

improper hindsight reconstruction of the present claims and necessarily takes into account knowledge that was not within the level of ordinary skill at the time the claimed invention was made.[1]

Thus, it is clear that Ferguson in view of Muller cannot teach or suggest acid modified dry-milled **flour** compositions as set forth in claim 1, which is not an isolated and purified carbohydrate composition like the compositions disclosed in Ferguson and Muller. Rather, the **flour** composition recited in claim 1 contains additional components, such as, fats and proteins. Indeed, by emphasizing isolated carbohydrates, Ferguson and Muller are directed away from flour compositions, and therefore, the reference combination may be said to teach away from a composition as recited in claim 1.[2]

The Examiner also asserts that the starch composition disclosed in Ferguson is prepared in a substantially similar manner as the composition recited in claim 1, and therefore, the starch composition in Ferguson would be expected to have the same properties as the compositions recited in claim 1. In this regard, the Examiner is apparently relying upon an inherency argument. However, the Examiner's assertion and the underlying inherency argument are incorrect.

"To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." MPEP § 2112.IV (citations omitted).

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[1] The MPEP instructs in regards to obviousness determinations that "impermissible hindsight must be avoided and the legal conclusion must be reached on a basis of the facts gleaned from the prior art." MPEP § 2142. The Examiner may only take into account knowledge within the level of ordinary skill at the time the claimed invention was made, and may not include knowledge gleaned from the applicant's own disclosure. MPEP § 2145.X.

[2] A reference is said to "teach away" from a claimed invention when it "suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant." In re Gurley, 27 F.3d 551, 553 (Fed. Cir. 1994). Furthermore, "[a] reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be...led in a direction divergent from the path that was taken by the applicant." Id.; see also Para-Ordnance Mfg. v. SGS Importers Int'l, 73 F.3d 1085, 1090 (Fed. Cir. 1995).

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." MPEP § 2112.IV (citations omitted) (emphasis in original). Here, the Examiner's asserted combination of Ferguson and Muller does not necessarily possess the properties recited in claim 1.

Referring to paragraphs [0039] and [0040] in the Subject Application, the processes used to produce the acid modified dry-milled flour composition recited in claim 1 may utilize an appropriate amount of acid, which may be based, in part, on the fat content of the base dry-milled flour. In fact, Examples 1-6 in the Subject Application clearly indicate that the compositions of the present invention contain a fat content, which may be used to determine an acid component in a process for forming the acid modified flour composition. Indeed, claim 5, which Appellant hereby argues separately from claim 1, expressly recites an acid to fat processing relationship as described in the Subject Application. Moreover, claim 47, which Appellant hereby argues separately from claims 1 and 5, expressly recites a fat content of between 0.95 percent and 1.34 percent.

Ferguson and Muller, alone or in combination, do not teach or suggest an acid to fat relationship as a processing parameter. Ferguson and Muller, alone or in combination, also do not teach or suggest a fat content of between 0.95 percent and 1.34 percent. In fact, as discussed above, Ferguson and Muller exclude oil/fat content from the disclosed carbohydrate materials, and are thus incapable of being processed according to an acid to fat relationship. Therefore, because the carbohydrate starch materials disclosed in Ferguson and Muller are compositionally and chemically different and distinct from the compositions recited in claim 1, the materials disclosed in Ferguson and Muller cannot be processed in a similar manner as the composition recited in the present claims, including claim 5. In addition, the materials disclosed in Ferguson and Muller cannot contain a fat content of between 0.95 percent and 1.34 percent.

In addition, claim 48, which Appellant hereby argues separately from claims 1, 5, and 47, expressly recites a protein content of a cereal flour. As discussed above, Ferguson and Muller exclude protein content from the disclosed carbohydrate materials. Therefore, the materials disclosed in Ferguson and Muller cannot contain a protein content of a cereal flour.

Contrary to the assertions made by the Examiner, Appellant submits that a person skilled in the art would readily appreciate that the significant compositional differences discussed above would preclude similar fat content, protein content, and viscosity profiles. The Examiner has provided no explanation whatsoever as to why it would have been obvious to use flour compositions in the Ferguson process. Ferguson and Muller both fail to recognize and appreciate the advantages of a flour composition comprising carbohydrate, fat and protein. Indeed, Ferguson and Muller both suggest the purposeful removal of fat and protein from carbohydrate. In fact, Appellant submits that the non-carbohydrate components of flour (*e.g.*, protein and fat) would serve no purpose whatsoever in the Ferguson process, and would be impurities in the context of the Ferguson process. Thus, there would be no logical reason to modify Ferguson to employ a flour composition. Accordingly, the Office's reasoning in support of an obviousness conclusion is improper at least because the underlying factual teachings of the cited references do not suggest a flour composition as recited in the present claims.

In response to Appellants arguments submitted during prosecution, the Examiner has stated, in regard to the differences and distinctions discussed above, that "[i]f there are any difference [*sic*], the difference must be minor and obvious." Non-final Office Action, page 6, third paragraph. Appellant notes that "[i]n determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." MPEP §2141.02.I, citing Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530 [218 USPQ 871] (Fed. Cir. 1983); Schenck v. Nortron Corp., 713 F.2d 782 [218 USPQ 698] (Fed. Cir. 1983). After consideration of all the facts, the differences between the content of Ferguson in view of Muller and the subject

matter of the present claims are of such a tremendous magnitude that the present claims would not have been obvious to a person having ordinary skill in the art." MPEP § 2141.III.

The Subject Application, including the present claims, is directed to compositions that may find utility as binders in plaster slurry used to form the core of gypsum board. As described in the specification, the development of the acid modified dry-milled flour composition was directed toward improving and providing advantages over conventional wallboard materials. See Specification, para. [0063]. The materials described in Ferguson are directed toward paper coating applications (c.2, ll.20-22), and the materials described in Muller are directed toward providing fermentable sugars for ethanol production (c.1, l.21 - c.2, l.2). Neither reference mentions gypsum wallboard or even a remotely related composite material. Accordingly, neither reference could possibly suggest, let alone recognize and appreciate, the importance of the viscosity profile recited in claim 1 and described in the Subject Application.

Thus, Appellant submits that claims 1, 5, 47, and 48, individually, would not have been obvious in view of Ferguson and Muller, alone or in combination.

(2) Claims 10 and 13 would not have been obvious in view of Ferguson and Muller.

Claim 10 is similar to claim 1. Accordingly, Appellant hereby incorporates all of the arguments set forth above in **Section (A)(1)** in connection with claim 1, which Appellant submits are equally relevant in connection with claim 10. Relative to claim 1, the composition recited in claim 10 is characterized by an at least 40 percent decrease in viscosity from the 600-1600 BU torque maximum at gelatinization within 8.4 minutes from time zero. The composition recited in claim 10 also comprises a protein content of a cereal flour.

There is no disclosure in Ferguson or Muller that would have taught or suggested the importance of a viscosity profile having the features recited in claim 10. As

described in paragraph [0053] of the specification, an acid modified dry-milled flour composition comprising a viscosity profile having the features recited in claim 10 possesses improved performance as a binder composition for gypsum board. The references cited by the Examiner do not recognize or appreciate these viscosity features or their relation to binder compositions for gypsum board cores.

In addition, claim 10, expressly recites a protein content of a cereal flour. As discussed above, Ferguson and Muller teach and/or suggest the purposeful removal of protein content from the disclosed carbohydrate materials. Therefore, the materials disclosed in Ferguson and Muller cannot contain a protein content of a cereal flour.

Furthermore, claim 13, which Appellant hereby argues separately from claim 10, expressly recites an acid to fat processing relationship. Ferguson and Muller teach and/or suggest the purposeful removal of oil/fat content from the disclosed carbohydrate materials. Therefore, the materials disclosed in Ferguson and Muller are incapable of being processed according to an acid to fat relationship.

Thus, Appellant submits that claims 10 and 13, individually, would not have been obvious in view of Ferguson and Muller, alone or in combination.

(3) Claims 18 and 46 would not have been obvious in view of Ferguson and Muller.

Claim 18 is similar to claim 1. Accordingly, Appellant hereby incorporates all of the arguments set forth above in **Section (A)(1)** in connection with claim 1, which Appellant submits are equally relevant in connection with claim 18. Relative to claim 1, the composition recited in claim 18 is characterized by a decrease in viscosity from the 600-1600 BU torque maximum at gelatinization and a subsequent increase in viscosity to a value that is substantially the same as the maximum value achieved at gelatinization by the end of a constant temperature holding period.

There is no disclosure in Ferguson or Muller that would have taught or suggested the importance of a viscosity profile having the features recited in claim 18. As described in paragraphs [0049] and [0053], and in Table 1 on page 17 of the specification, and as illustrated in Figures 5 and 6, an acid modified dry-milled flour composition comprising a viscosity profile having the features recited in claim 18 possesses improved performance as a binder composition for gypsum board. The references cited by the Examiner do not recognize or appreciate these viscosity features or their relation to binder compositions for gypsum board cores.

In addition, claim 46, which Appellant hereby argues separately from claim 18, expressly recites a fat content of between 0.95 percent and 1.34 percent. Ferguson and Muller teach and/or suggest the purposeful removal of oil/fat content from the disclosed carbohydrate materials. Therefore, the materials disclosed in Ferguson and Muller are incapable of having a fat content of between 0.95 percent and 1.34 percent.

Thus, Appellant submits that claims 18 and 46, individually, would not have been obvious in view of Ferguson and Muller, alone or in combination.

(4) Claims 26 and 49 would not have been obvious in view of Ferguson and Muller.

Claim 26 is a product-by-process claim reciting an acid modified dry-milled flour composition produced by a particular process. The process comprises dry-milling a grain, thus forming a flour. The flour is combined with an acid to form a mixture. The mixture is heated to a temperature of 85°C or less for a sufficient time effective to obtain the acid modified dry-milled flour composition. The process steps recited in claim 26 may be used to produce an acid modified dry-milled flour composition comprising a viscosity profile having the features recited in any of claims 1, 10, 18, and 50. As described above, a person having skill in the art would have had no reason to modify Ferguson to arrive at a process comprising the steps recited in claim 26 to form a **flour**

composition that provides significant advantages as a binder composition for gypsum board cores.

In addition, claim 46, which Appellant hereby argues separately from claim 18, expressly recites a fat content of between 0.95 percent and 1.34 percent. Ferguson and Muller teach and/or suggest the purposeful removal of oil/fat content from the disclosed carbohydrate materials. Therefore, the materials disclosed in Ferguson and Muller are incapable of having a fat content of between 0.95 percent and 1.34 percent.

Thus, Appellant submits that claims 26 and 49, individually, would not have been obvious in view of Ferguson and Muller, alone or in combination.

(5) Claim 50 would not have been obvious in view of Ferguson and Muller.

Claim 50 is similar to claim 1. Accordingly, Appellant hereby incorporates all of the arguments set forth above in **Section (A)(1)** in connection with claim 1, which Appellant submits are equally relevant in connection with claim 50. Relative to claim 1, the composition recited in claim 50 is formed from a flour selected from the group consisting of dry-milled milo flour, dry-milled corn flour, and combinations thereof. Again, as discussed above, Ferguson and Muller actually teach away from flour by emphasizing isolated carbohydrates.

Thus, Appellant submits that claim 50 would not have been obvious in view of Ferguson and Muller, alone or in combination.

Appellant submits that any claim not expressly discussed in this Appeal Brief is patentable for at least the reasons discussed above because such claims depend from an independent claim discussed above, and therefore, such claims incorporate by reference all of the patentable features discussed above.

As discussed above, Ferguson and Muller, alone or in combination, fail to teach or suggest a flour composition as recited in the present claims. A person skilled in the art considering the cited references at the time of the present invention would not have found the features recited in the present claims to be obvious or inherent. Therefore, Appellant respectfully submits that a *prima facie* case under § 103(a) has not been established by the Examiner. Accordingly, Appellant respectfully requests withdrawal of the § 103(a) rejections.

(B) THE EXAMINER SHOULD REJOIN CLAIMS 8, 9, 16, 17, 24, 25, 34, AND 35 **BECAUSE THEY DEPEND FROM ALLOWABLE INDEPENDENT CLAIMS.**

In the Restriction Requirement mailed on February 7, 2007, the Examiner imposed a requirement for restriction to one of the following inventions:

I. Claims 1-7, 10, 15, 18-23, and 26-33, drawn to a flour composition;

II. Claims 8, 16, 24, and 34, drawn to a gypsum slurry;

III. Claims 9, 17, 25, and 35, drawn to a gypsum drywall product; and

IV. Claims 36-45, drawn to a method of making a starch composition.

Claims 11-14 were not included by the Examiner in any of the four respective groupings, but were subsequently grouped with Group I. In the Response to the Restriction Requirement filed on March 6, 2007, Appellant elected Group I without traverse. In the Response filed on September 4, 2007, in reply to the first Office Action on the merits, Appellant canceled claims 36-45 without prejudice or disclaimer and listed claims 8, 9, 16, 17, 24, 25, 34, and 35 as withdrawn from consideration. Claims 8, 9, 16, 17, 24, 25, 34, and 35 have remained pending but withdrawn from consideration during the subsequent prosecution of the Subject Application.

According to MPEP § 821.04, to be eligible for rejoinder, a claim to a non-elected invention must depend from or otherwise require all the limitations of an allowable claim. Here, claims 8 and 9 depend from independent claim 1, claims 16 and 17 depend from

independent claim 10, claims 24 and 25 depend from independent claim 18, and claims 34 and 35 depend from independent claim 26. Therefore, withdrawn claims 8, 9, 16, 17, 24, 25, 34, and 35 are eligible for rejoinder.

VIII. CLAIMS APPENDIX

1. An acid modified dry-milled flour composition comprising a viscosity profile, wherein at a 14.5% solids concentration, a starting temperature of 30°C, and a heating rate increase of 7.5°C/min, the composition at a time 0 through gelatinization undergoes a viscosity increase to a maximum value in the range of between 600 and 1600 BU torque at a time in the range of between 6.5 to 7.2 minutes, followed by a decrease in viscosity to a value in the range of 240 to 640 BU torque at a time of 8.4 minutes, based on a Brabender micro visco amylograph.

2. The composition of claim 1, wherein the viscosity increases to a maximum value in the range of between 750 and 1350 BU torque.

3. The composition of claim 2, wherein the viscosity decreases to a value in the range of between 300 to 600 BU torque.

4. The composition of claim 1, wherein the viscosity increases to the maximum value at a time in the range of between 6.7 to 7.0 minutes.

5. The composition of claim 1, wherein the acid modified flour composition is formed from:

an acid component; and

a flour component having an amount of fat, wherein the amount of the acid component is added, at least in part, relative to the fat percent in the flour component.

6. The composition of claim 5, wherein the acid component is hydrochloric acid.

7. The composition of claim 5, wherein the flour component is formed from a flour composition selected from the group consisting of dry milled milo flour, dry milled corn flour, and combinations thereof.

8. A gypsum slurry formed from the flour composition of claim 1.

9. A drywall product formed from a gypsum slurry composition comprising the flour composition of claim 1.

10. An acid modified dry-milled flour composition comprising:

a viscosity profile, wherein at a 14.5% solids concentration, a starting temperature of 30°C, and a heating rate increase of 7.5°C/min, the composition at a time 0 through gelatinization undergoes a viscosity increase to a maximum value in the range of between 600 and 1600 BU torque at a time in the range of between 6.5 to 7.2 minutes, followed by at least a 40 percent decrease in viscosity at a time of 8.4 minutes, based on a Brabender micro visco-amylo-graph; and

the composition having a protein content of a cereal flour.

11. The composition of claim 10, wherein the viscosity decreases in the range of between 45 to 65 percent.

12. The composition of claim 10, wherein the viscosity increases to a maximum value at a time in the range of between 6.7 to 7.0 minutes.

13. The composition of claim 10, wherein the acid modified flour composition is formed from:

an acid component; and

a flour component having an amount of fat, wherein the amount of the acid component is added, at least in part, relative to the fat percent in the flour component.

14. The composition of claim 13, wherein the acid component is hydrochloric acid.

15. The composition of claim 13, wherein the flour component is formed from a flour composition selected from the group consisting of dry milled milo flour, dry milled corn flour, and combinations thereof.

16. A gypsum slurry formed from the flour composition of claim 10.

17. A drywall product formed from a gypsum slurry composition comprising the flour composition of claim 10.

18. An acid modified dry-milled flour composition comprising a viscosity profile, wherein at a 14.5% solids concentration, a starting temperature of 30°C, and a heating/cooling rate of 7.5°C/min, the composition at a time 0 through gelatinization undergoes a viscosity increase to a maximum value in the range of between 600 and 1600 BU torque at a time in the range of between 6.5 to 7.2 minutes, followed by a decrease in viscosity and a subsequent increase in viscosity at the end of a final holding period to a value that is substantially the same as the maximum value, based on a Brabender micro visco amylograph.

19. The composition of claim 18, wherein upon gelatinization the viscosity increases to a maximum value in the range of between 750 and 1350 BU torque.

20. The composition of claim 18, wherein at the end of the final holding period the viscosity increases to a value that is within 17 percent of the maximum value.

21. The composition of claim 18, wherein at the end of the final holding period the viscosity increases to a value that is within 11 percent of the maximum value.

22. The composition of claim 18, wherein at the end of the final holding period the viscosity increases to a value that is within 5 percent of the maximum value.

23. The composition of claim 20, wherein upon gelatinization the viscosity increases to a maximum value at a time in the range of between 1.0 to 2.0 minutes.

24. A gypsum slurry formed from the flour composition of claim 18.

25. A drywall product formed from a gypsum slurry composition comprising the flour composition of claim 18.

26. An acid modified dry-milled flour composition, the composition formed by the process comprising:

dry-milling a grain, thus forming a flour;

combining an acid component and the flour to form a mixture;

heating the mixture to a temperature of 85°C or less for a sufficient time effective to obtain the acid modified dry-milled flour composition.

27. The acid modified dry-milled flour composition of claim 26, wherein the acid component is hydrochloric acid.

28. The acid modified dry-milled flour composition of claim 26, wherein the flour is formed from a grain selected from the group consisting of milo grain, corn grain, and combinations thereof.

29. The acid modified dry-milled flour composition of claim 26, wherein the heating is performed at a temperature in the range of 72°C to 85°C.

30. The acid modified dry-milled flour composition of claim 29, wherein the heating is performed at a temperature in the range of 76°C to 79°C.

31. The acid modified dry-milled flour composition of claim 26, wherein the heating is performed for a time of 0.5 hours or less.

32. The acid modified dry-milled flour composition of claim 31, wherein the heating is performed for a time in the range of 0.25 to 0.5 hours.

33. The acid modified dry-milled flour composition of claim 31, wherein the heating is performed for a time in the range of 0.01 to 0.25 hours.

34. A gypsum slurry formed from the flour composition of claim 26.

35. A drywall product formed from a gypsum slurry composition comprising the flour composition of claim 26.

46. The composition of claim 18, the composition having a fat content of between 0.95 percent and 1.34 percent.

47. The composition of claim 1, the composition having a fat content of between 0.95 percent and 1.34 percent.

48. The composition of claim 47, the composition having a protein content of a cereal flour.

49. The composition of claim 26, the composition having a fat content of between 0.95 percent and 1.34 percent.

50. An acid modified dry-milled flour composition formed from the group consisting of dry milled milo flour, dry milled corn flour, and combinations thereof, comprising a viscosity profile, wherein at a 14.5% solids concentration, a starting temperature of 30°C, and a heating rate increase of 7.5°C/min, the composition at a time 0 through gelatinization undergoes a viscosity increase to a maximum value in the range of between 600 and 1600 BU torque at a time in the range of between 6.5 to 7.2 minutes, followed by a decrease in viscosity to a value in the range of 240 to 640 BU torque at a time of 8.4 minutes, based on a Brabender micro visco amylograph.

IX. EVIDENCE APPENDIX

The content of this Evidence Appendix includes the following:

- None

X. RELATED PROCEEDINGS APPENDIX

The content of this Related Proceedings Appendix includes the following:

- a copy of the Remarks for Pre-Appeal Conference filed on April 21, 2009; and
- the Notice of Panel Decision from Pre-Appeal Brief Review mailed April 27, 2009.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Bailey et al.	
Application Serial No. 10/820,972	STARCH BINDER COMPOSITIONS, METHODS OF MAKING THE SAME AND PRODUCTS FORMED THEREFROM
Filing Date: April 8, 2004	
Art Unit 1793	
Examiner Abu Ali Shuangyi	
Confirmation No. 9539	Docket No. 030621/MIL.0005.US00

ARGUMENTS AND REMARKS FOR PRE-APPEAL BRIEF CONFERENCE

Pittsburgh, Pennsylvania 15222-2312
April 21, 2009

VIA ELECTRONIC MAIL

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Final Office Action mailed from the U.S. Patent and Trademark Office on January 21, 2009 ("Office Action"), in the above-identified patent application ("Subject Application"), Applicants request a Pre-Appeal Brief Conference in accordance with the guidelines in the "New Pre-Appeal Brief Conference Pilot Program" announcement, which appeared in the July 12, 2005 issue of the *Official Gazette*. In accordance with those guidelines, Arguments for the conference are presented herein. The issues addressed herein are ripe for appeal in accordance with 37 C.F.R. § 41.31(a)(1), the claims having been subject to at least two rejections.

Filed concurrently herewith are (1) a Notice of Appeal, (2) a Pre-Appeal Brief Request for Review (form PTO/SB/33), (3) the fee under 37 C.F.R. § 41.20(b)(1), and (4) an after-final Amendment in compliance with 37 C.F.R. § 1.116. Any fee deficiency or overpayment may be charged or credited, respectively, to Deposit Account No. 11-1110.

Claims 1-35 and 46-50 are pending in the Subject Application. Claims 1, 10, 18, 26 and 50 are independent claims, and claims 8-9, 16-17, 24-25 and 34-35 are withdrawn. Claims 1-7, 10-15, 18-23, 26-33 and 46-50 stand rejected under 35 U.S.C. § 103(a) as unpatentable over

U.S. Patent No. 5,766,366 to Ferguson et al. ("Ferguson") in view of U.S. Patent No. 4,407,955 to Muller et al. ("Muller"). For at least the reasons set forth herein, and the arguments already of record, Applicant respectfully submits that the Office failed to establish a *prima facie* case of obviousness, and therefore, the rejection under § 103(a) must be withdrawn.

Applicant submits that Ferguson and Muller, alone or in combination, fail to render the present claims obvious for at least the following reasons: (1) the compositions described in the cited references and the compositions recited in the present claims are different and distinct; (2) the reasoning provided by the Office in support of the § 103(a) rejection is improper; and (3) the cited references fail to teach or suggest all the features recited in the present claims.

I. The compositional distinctions between the cited references and the present claims

The independent claims each recite "An acid modified dry-milled flour composition." As stated in paragraph [0021] in the original specification, "the term 'dry-milled starch' refers to the **flour** product of a processed raw grain in the substantial absence of liquid, as compared to the pure starch of a wet milled cereal grain (emphasis added)."[1] This sentence in the specification describes the significant differences between starch compositions (as disclosed in Ferguson and Muller) and four compositions (as recited in the present claims).

A person having ordinary skill in the art would clearly recognize the fact that the flour composition recited in the present claims and the starches disclosed in Ferguson and Muller are distinctly different materials. Starch is a polysaccharide carbohydrate material having glucose monosaccharide units linked together by glycosidic bonds. Chemically, starch is a relatively pure material consisting essentially of polysaccharide molecules. In contrast, flour is a particulate mixture produced by grinding or milling raw grains or other vegetative materials. Accordingly, flour may comprise, *inter alia*, ash, starch, oils/fats, proteins, and fibers. Thus, starch and flour are two (2) distinctly different materials.

It is clearly evident that Ferguson discloses purified starch materials. For example, Ferguson describes amylopectin, amylose, and chemically derivatized versions thereof (c.2, ll.16-60). Indeed, following a detailed review of the reference, Ferguson does not even mention, *inter alia*, "flour," "fat," or "protein" in any capacity whatsoever. A person having skill in the art would recognize that the dry-thinning process described in Ferguson is designed to modify pure starch polysaccharide, which has been isolated from other raw grain components (c.2, ll.17-19, describing "thinning" as a process for reducing the molecular weight of starch via chemical

[1] The independent claims have been amended to delete the term "starch" and expressly recite "flour" in accordance with paragraph [0021]. See the Amendment filed concurrently herewith.

hydrolysis by gaseous acidification). Thus, Ferguson fails to teach or suggest a flour composition.

In direct contrast, the presently amended claims recite "dry-milled flour." Flour is a multi-component product of a processed raw grain comprising carbohydrate, protein, fats, fibers, and the like. See, for example, paragraph [0039] of the original specification, stating "The present invention may use relatively pure cereal flours having various levels of proteins as well as other components, such as ash, fiber, and fat." The materials disclosed in Ferguson are therefore compositionally distinct from the materials recited in the present claims. Thus, it is clear that Ferguson cannot possibly teach or suggest a dry-milled flour composition as recited in the present claims.

Muller does not remedy the deficiencies of Ferguson. Muller discloses converting the starch fraction derived from dry-milled cereal grain into a solution of monosaccharide sugar. Specifically, Muller discloses hydrolyzing a slurry of the starch fraction, separating and removing any residual protein and oil from the starch hydrolysate, and further hydrolyzing the resulting purified starch to provide a solution of glucose (c.4, ll.5-64). Muller also discloses removing "the protein, oil and/or fiber from the partial hydrolysate prior to subjecting the latter to final hydrolysis" (c.5, ll.4-7). Thus, Muller does not teach or suggest a flour composition (which may contain substantial amounts of protein, oil and/or fiber).

Ferguson teaches a thinned starch product produced using a hydrolysis process on an isolated starch feed, and Muller teaches a glucose product produced using a hydrolysis process on a feed consisting of the isolated starch fraction of dry-milled cereal grain. Both references are directed to isolated and purified carbohydrate compositions. In contrast, the composition recited in the present claims is a flour product of a processed raw grain. As such, the flour product recited in the present claims is not an isolated and purified carbohydrate composition like the compositions disclosed in Ferguson and Muller. Rather, the flour composition recited in the present claims contains additional components, such as, for example, fat and protein. Ferguson and Muller are directed away from flour compositions containing fat and protein. Therefore, the reference combination cannot teach or suggest an acid modified dry-milled flour composition as recited in the present claims.

II. The lack of proper reasoning to support obviousness in view of the cited references

In the Office Action, the Office asserts that "it would have been obvious to one of ordinary skill in the art at the time of the invention by applicant to use a dry mill starch in the Ferguson et al. process, motivated by the fact that Muller et al., also drawn to starch treatment,

disclose [*sic*] that starch made from dry mill process [*sic*] is cheap and economic." However, this assertion improperly ignores the technical disclosure in both Ferguson and Muller, and therefore, it is irrelevant to the question of whether the present claims are obvious.

Rejections on obviousness grounds cannot be sustained with mere conclusory statements or unsupported assertions; the examiner must clearly articulate logical reasoning with rational underpinnings based on factual evidence to support the legal conclusion of obviousness. See MPEP § 2141; KSR International Co. v. Teleflex Inc., 550 U.S. 398, 82 USPQ2d 1385 (2007); In re Oetiker, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). The teachings of prior art references are underlying factual questions in the obviousness inquiry. See Para-Ordnance Mfg., Inc. v. SDS Imp. Int'l, Inc., 73 F.3d 1085, 1088 (Fed. Cir. 1995).

The combined teachings of Ferguson and Muller clearly do not suggest a dry-milled **flour** composition. As between dry-milling and wet-milling, dry-milling may be the less expensive milling process, but the dry-milling process of Muller is still used to obtain starch. As a result, *arguendo,* a person having skill in the art may use a dry-milling process to mill a cereal grain and isolate the starch fraction from the other grain fractions as described in Muller, and then process the isolated starch fraction according to the thinning process disclosed in Ferguson. However, performing these combined steps still fails to produce an acid modified dry-milled **flour** composition because the references suggest isolating starch from the other raw grain components.

Ferguson and Muller both fail to recognize and appreciate the advantages of a flour composition comprising starch, fat and protein. Indeed, Ferguson and Muller both suggest the purposeful removal of fat and protein from starch. Thus, the fact that dry-milling may be cheaper than wet-milling is irrelevant because Ferguson and Muller are entirely directed to starch and starch processing. The references exclude flour materials comprising protein and fat. In fact, the non-carbohydrate components of flour would have no purpose whatsoever in the Ferguson process or the Muller process, and would be impurities in the context of those processes. Thus, there would be no logical reason to modify the cited references to employ a flour composition. Accordingly, the Office's reasoning in support of an obviousness conclusion is improper at least because the underlying factual teachings of the cited references do not suggest a flour composition.

III. The cited references fail to teach or suggest the properties recited in the claims

In the Office Action, the Office asserts that the starch composition disclosed in Ferguson is prepared in a substantially similar manner as the flour composition recited in the present

claims, and therefore, the starch composition in Ferguson would be expected to have the same material properties as the flour composition recited in the present claims. However, this assertion is incorrect.

As discussed above, Ferguson and Muller exclude fat and protein content from the disclosed starch materials. Therefore, because the starch materials disclosed in Ferguson and Muller are significantly different than the flour material recited in the present claims, the material disclosed in the references cannot possess the same properties as recited in the claims. Contrary to the assertions made by the Office, a person having ordinary skill in the art would readily recognize that the significant compositional differences preclude similar fat and protein content as recited in the present claims. Indeed, Ferguson and Muller teach or suggest the removal of fat and protein from starch. In addition, isolated and purified starch materials would likely possess significantly different viscosity properties than those recited in the present claims in conjunction with a flour composition. A person having skill in the art would recognize that fat and protein content would have a significant effect on viscosity properties in this context. Thus, the cited references cannot teach or suggest the material properties recited in the present claims.

IV. Conclusion

Ferguson and Muller fail to teach or suggest a flour composition as recited in the present claims. Therefore, Applicants respectfully submit that a *prima facie case has not been established.* Accordingly, Applicants respectfully request withdrawal of the § 103(a) rejection and allowance of the pending claims.

Respectfully submitted,

4-21-2009
Date

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ART UNIT	**PAPER NUMBER**
1793	
MAIL DATE	**DELIVERY MODE**
04/27/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/820,972	BAILEY ET AL.	
	Christopher A. Fiorilla	Art Unit 1700	

Document Code - AP.PRE.DEC

Notice of Panel Decision from Pre-Appeal Brief Review

This is in response to the Pre-Appeal Brief Request for Review filed 4/21/09.

1. ☐ **Improper Request** – The Request is improper and a conference will not be held for the following reason(s):

☐ The Notice of Appeal has not been filed concurrent with the Pre-Appeal Brief Request.
☐ The request does not include reasons why a review is appropriate.
☐ A proposed amendment is included with the Pre-Appeal Brief request.
☐ Other:

The time period for filing a response continues to run from the receipt date of the Notice of Appeal or from the mail date of the last Office communication, if no Notice of Appeal has been received.

2. ☒ **Proceed to Board of Patent Appeals and Interferences** – A Pre-Appeal Brief conference has been held. The application remains under appeal because there is at least one actual issue for appeal. Applicant is required to submit an appeal brief in accordance with 37 CFR 41.37. The time period for filing an appeal brief will be reset to be one month from mailing this decision, or the balance of the two-month time period running from the receipt of the notice of appeal, whichever is greater. Further, the time period for filing of the appeal brief is extendible under 37 CFR 1.136 based upon the mail date of this decision or the receipt date of the notice of appeal, as applicable.

☒ The panel has determined the status of the claim(s) is as follows:
Claim(s) allowed: _____.
Claim(s) objected to: _____.
Claim(s) rejected: 1-7,10-15, 18-23, 26-33 and 46-50.
Claim(s) withdrawn from consideration: 8,9,16,17,24,25,34 and 35.

3. ☐ **Allowable application** – A conference has been held. The rejection is withdrawn and a Notice of Allowance will be mailed. Prosecution on the merits remains closed. No further action is required by applicant at this time.

4. ☐ **Reopen Prosecution** – A conference has been held. The rejection is withdrawn and a new Office action will be mailed. No further action is required by applicant at this time.

All participants:

(1) Christopher A. Fiorilla.

(2) Jerry Lorengo.

(3) Shuangyi Abu Ali.

(4)_____.

XI. CONCLUSION

For the reasons discussed above, Appellant respectfully asks the Board to direct the Examiner to: (1) withdraw the obviousness rejections under 35 U.S.C. § 103(a) in the Final Office Action; (2) rejoin the withdrawn claims; and (3) issue a Notice of Allowance for the claims pending in the Subject Application.

Respectfully submitted,

6-19-2009
Date

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